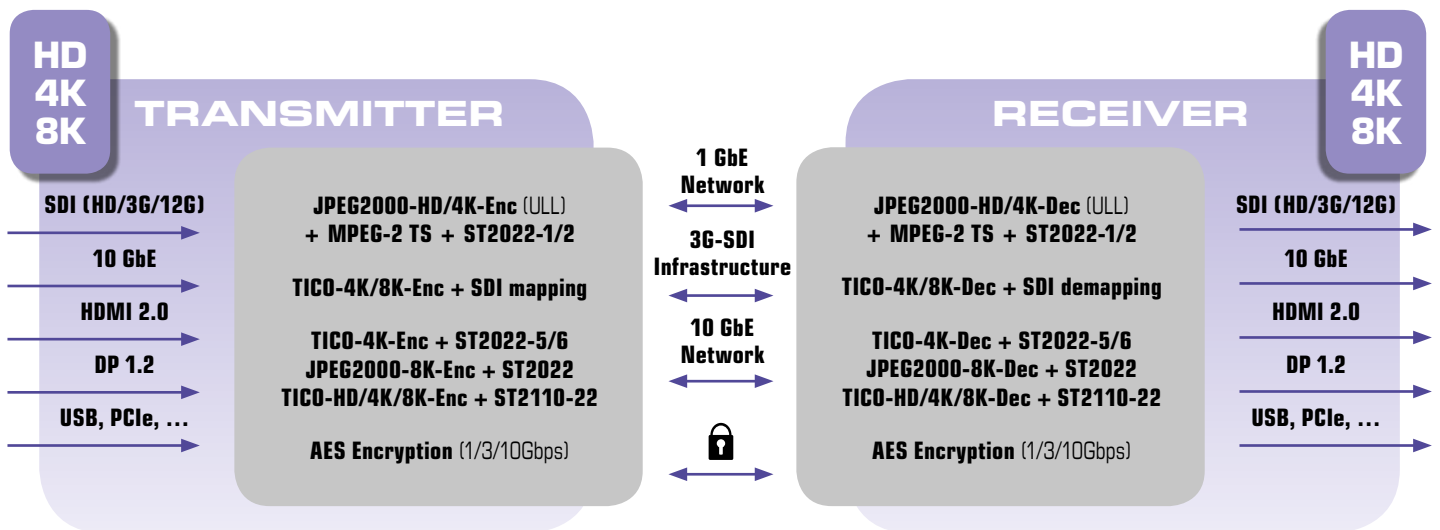# VIDEO TRANSPORT

FPGA
XILINX®
ALLIANCE PROGRAM
CERTIFIED MEMBER

Reliable network solutions for **Live HD, 4K** and **8K**

intoPIX has developed breakthrough video transport FPGA solutions for customers that bridge the worlds of professional video production and IP networks.

Today, intoPIX is extending its video transport expertise to address complex issues in the delivery of video data in HD, 4K or 8K through IP networks in Broadcast, Pro-AV and Digital Cinema workflows with minimum latency, maximum reliability, quality, cost effectiveness and interoperability.

HD 4K 8K

TRANSMITTER

- SDI (HD/3G/12G)
- 10 GbE
- HDMI 2.0
- DP 1.2
- USB, PCIe, …

JPEG2000-HD/4K-Enc (ULL)
+ MPEG-2 TS + ST2022-1/2

TICO-4K/8K-Enc + SDI mapping

TICO-4K-Enc + ST2022-5/6
JPEG2000-8K-Enc + ST2022
TICO-HD/4K/8K-Enc + ST2110-22

AES Encryption (1/3/10Gbps)

1 GbE Network
3G-SDI Infrastructure
10 GbE Network

RECEIVER

JPEG2000-HD/4K-Dec (ULL)
+ MPEG-2 TS + ST2022-1/2

TICO-4K/8K-Dec + SDI demapping

TICO-4K-Dec + ST2022-5/6
JPEG2000-8K-Dec + ST2022
TICO-HD/4K/8K-Dec + ST2110-22

AES Encryption (1/3/10Gbps)

- SDI (HD/3G/12G)
- 10 GbE
- HDMI 2.0
- DP 1.2
- USB, PCIe, …

HD 4K 8K

Video over IP reference design

> SMPTE 2022-1/2 with Xilinx Series 7
 - VSF TR01 compliant
 - J2K Ultra Low Latency support

> SMPTE 2022-5/6 or SMPTE 2110-22
 (Xilinx Series 7)
 - TICO over SDI/ST2022-6
 - TICO over RTP (as SMPTE 2110-22)

Video over SDI applications

> UHD4K over 3G-SDI with TICO lightweight compression

> UHD8K over 12G-SDI with TICO lightweight compression

Compression & security IP-cores

> JPEG 2000 compression

> TICO lightweight compression

> AES real-time encryption

> MPEG-2 TS - for codestream/uncompressed audio encapsulation

intoPIX

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JPEG 2000/TICO video over IP

The reference designs combine both intoPIX JPEG 2000 or TICO compression cores with Xilinx and Macnica Video over IP IP-cores to carry HD and UHD4K video over 1GbE or 10GbE IP networks on a Xilinx Kintex-7 FPGA.

TICO lightweight compression IP-cores, with a pixel line-based latency, can be used as a smart way to map 4K video over IP using an SMPTE 2022-5/6 or SMPTE 2110-22 IP infrastructure. intoPIX JPEG 2000 4K cores can be directly integrated to carry 4K over an SMPTE 2022-1/2 1G network.

The reference designs answer broadcasters' needs for a cost-effective and reliable solution to enable the migration toward IP networks for video transport such as contribution links, studio over IP, remote production and monitoring ...

JPEG 2000 over TS over SMPTE 2022 1/2:

In collaboration with Xilinx, intoPIX can deliver a ready-to-use SMPTE 2022 reference design that has successfully participated in the J2K VSF interop tests.

Fully compliant with the VSF (Video Services Forum) technical recommendation, "Transport of JPEG 2000 Broadcast profile video in MPEG-2 TS over IP", intoPIX JPEG 2000 and MPEG-2 TS cores, guarantee a faster time to market to new adopters. The design has been successfully connected with the equipment of major players in the broadcast market.

Key features:
- intoPIX HD & 4K JPEG 2000 and MPEG-2 TS encapsulation IP-cores
- Xilinx SMPTE 2022 IP-cores for IP transport
- Ultra Low Latency option (down to 10 ms end-to-end)
- Compliant with VSF TR01
- Carry HD and UHD 4K on 1GE networks
- Reference application and IP-cores available from intoPIX, Xilinx and Macnica

EMMY® Award-winning intoPIX JPEG2000 solutions

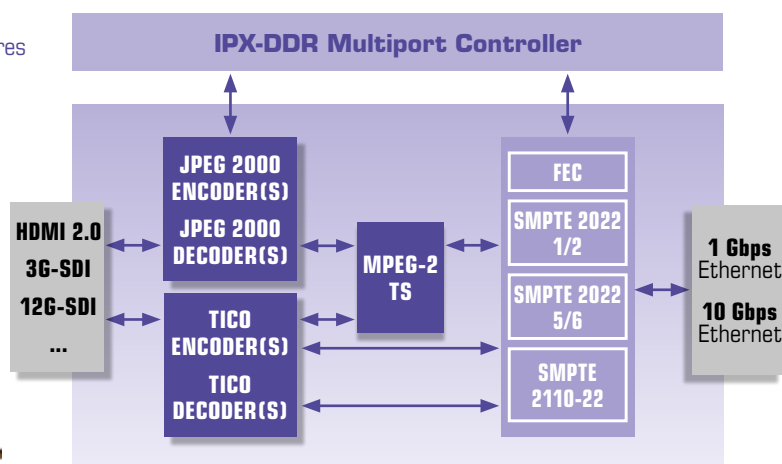THE NATIONAL ACADEMY OF TELEVISION ARTS & SCIENCES

TICO over SMPTE 2022 5/6 and SMPTE 2110-22:

Leveraging the power of SMPTE 2022-5/6 and SMPTE 2110-22, intoPIX can embed the TICO lightweight compression to carry more HD streams, higher resolution (4K/8K) or higher frame rates (60p,120p) without any impact on latency.

Key features:
- SMPTE 2022-5/6 integrating TICO lightweight compression to carry up to 3 streams of 4K60p over 10 GbE
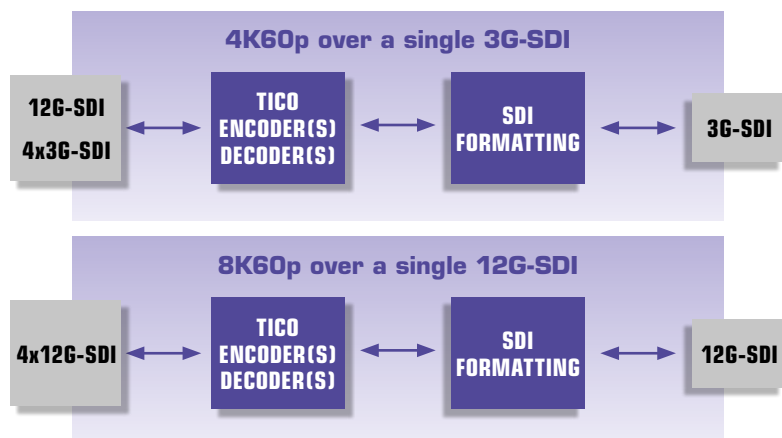- SMPTE 2110-22 using independent TICO RTP streams

4K TICO over 3G-SDI
8K TICO over 12G-SDI

Leveraging the existing SDI infrastructures, TICO lightweight compression can be embedded in the active area of the 3G-SDI in order to carry 4K 60P over a single 3G-SDI cable without any impact on quality and latency.
For 8K 60P, it can be embedded over a single 12G-SDI cable.

Key features:
- Efficient mapping on SDI following the SMPTE RDD35 recommendations (avoiding forbidden values)
- Leverage existing and deployed 3G-SDI equipments for 4K
- Leverage existing and deployed SMPTE 2022-6 equipments
- Leverage more value from your migration to 12G-SDI to support 8K easily

VIDEO TRANSPORT XILINX -may.19

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